APPENDIX G

Extra Data Sheets

Citizens Qualitative Habitat Evaluation Index
Stream Flow Calculation Worksheet
Stream Site Map
Standard Chemical Monitoring (GREEN) Data Sheet
Chemical Monitoring Worksheet
Advanced Chemical Monitoring Data Sheet
Biological Monitoring Data Sheet
Macroinvertebrate Identification Key
Internet Database Record-keeping Form

Date: _____

Citizens Qualitative Habitat Evaluation Index

CQHEI Total: _____

Vol ID: _____ Site ID: _____ River and Watershed: _____

I. Substrate (Bottom Type) — Score: _____

a) Size

- ☐ 14 pt — Mostly Large (Fist Size or Bigger)
- ☐ 10 pt — Mostly Medium (Smaller than Fist, but Bigger than Fingernail)
- ☐ 6 pt — Mostly Small (Smaller Than Fingernail, but Still Coarse, or Bedrock)
- ☐ 0 pt — Mostly Very Fine (Not Coarse, Sometimes Greasy or Mucky)

b) "Smothering"

- ☐ NO 5 pt — Are Fist Size and Larger Pieces Smothered By Sands/Silts?
- ☐ YES 0 pt — Symptoms: Hard to Move Large Pieces, Often Black on Bottom with Few Insects

c) "Silting"

- ☐ NO 5 pt — Are Silts and Clays Distributed Throughout Stream?
- ☐ YES 0 pt — Symptoms: Light Kicking of Bottom Results in Substantial Clouding of Stream for More than a Minute or Two

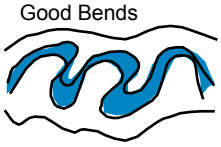
II. Fish Cover (Hiding Places) - Add 2 Points For Each One Present — Score: _____

- ☐ 2 pt — Underwater Tree Roots (Large)
- ☐ 2 pt — Underwater Tree Rootlets (Fine)
- ☐ 2 pt — Boulders
- ☐ 2 pt — Backwaters, Oxbows or Side Channels
- ☐ 2 pt — Downed Trees, Logs, Branches
- ☐ 2 pt — Shallow, Slow Areas for Small Fish
- ☐ 2 pt — Water Plants
- ☐ 2 pt — Deep Areas (Chest Deep)
- ☐ 2 pt — Undercut Banks
- ☐ 2 pt — Shrubs, Small Trees that Hang Close Over the Bank

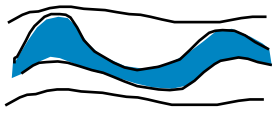
III. Stream Shape and Human Alterations — Score: _____

a) "Curviness" or "Sinuousity" of Channel

- ☐ 8 pt — 2 or More Good Bends



- ☐ 6 pt — 1 or 2 Good Bends



- ☐ 3 pt — Mostly Straight Some "Wiggle"

- ☐ 0 pt — Very Straight

b) How Natural Is The Site?

- ☐ 12 pt — Mostly Natural
- ☐ 9 pt — A Few Minor Man-made Changes (e.g., a bridge, some streambank changes)
- ☐ 6 pt — Many Man-made Changes, but still some natural conditions left (e.g., trees, meanders)
- ☐ 0 pt — Heavy, Man-made Changes (e.g., leveed or channelized)

IV. Stream Forests & Wetlands (Riparian Area) & Erosion — Score: _____

a) Width of Riparian Forest & Wetland - Mostly:

- ☐ 8 pt — Wide (Can't Throw A Rock Through/ Across It)
- ☐ 5 pt — Narrow (Can Throw A Rock Through/ Across It)
- ☐ 0 pt — None

b) Land Use - Mostly:

- ☐ 5 pt — Forest/Wetland
- ☐ 4 pt — Shrubs
- ☐ 3 pt — Overgrown Fields
- ☐ 2 pt — Fenced Pasture
- ☐ 2 pt — Park (Grass)
- ☐ 2 pt — Conservation Tillage
- ☐ 1 pt — Suburban
- ☐ 1 pt — Row Crop
- ☐ 0 pt — Open Pasture
- ☐ 0 pt — Urban/ Industrial

c) Bank Erosion - Typically:

- ☐ 4 pt — Stable Hard or Well-Vegetated Banks
- ☐ 2 pt — Combination of Stable and Eroding Banks
- ☐ 0 pt — Raw, Collapsing Banks

d) How Much of Stream is Shaded?

- ☐ 3 pt — Mostly
- ☐ 2 pt — Partly
- ☐ 0 pt — None

V. Depth & Velocity — Score: _____

a) Deepest Pool is At Least:

- ☐ 8 pt — Chest Deep
- ☐ 6 pt — Waist Deep
- ☐ 4 pt — Knee Deep
- ☐ 0 pt — Ankle Deep

b) Check ALL The Flow Types That You See (Add Points):

- ☐ 2 pt — Very Fast: Hard to Stand in the Current
- ☐ 3 pt — Fast: Quickly Takes Objects Downstream
- ☐ 1 pt — Moderate: Slowly Takes Objects Downstream
- ☐ 1 pt — Slow: Flow Nearly Absent
- ☐ 0 pt — None

VI. Riffles/Runs (Areas Where Current is Fast/Turbulent, Surface May Be Broken) — Score: _____

a) Riffles/Runs Are:

- ☐ 8 pt — Knee Deep or Deeper & Fast
- ☐ 6 pt — Ankle/Calf Deep & Fast
- ☐ 4 pt — Ankle Deep or Less & Slow
- ☐ 0 pt — Do Not Exist

b) Riffle/Run Substrates Are:

- ☐ 7 pt — Fist Size or Larger
- ☐ 6 pt — Smaller Than Fist Size, but Larger Than Fingernail
- ☐ 0 pt — Smaller Than Your Fingernails or Do Not Exist

Hoosier Riverwatch Stream Flow Calculation Worksheet

1. River Width (W)

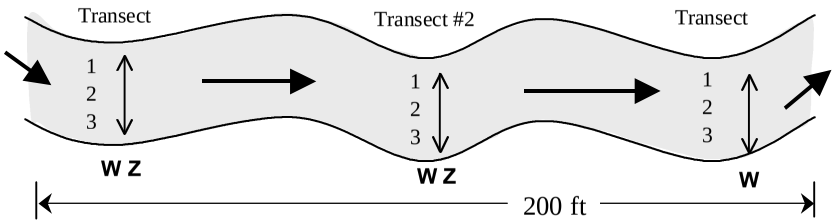
(One measurement at each transect.)

Transect #	Width (ft)
(1)	
(2)	
(3)	
Average Width (W)	

2. River Depth (Z)

(Three measurements along each transect.)

	Transect 1 (ft)	Transect 2 (ft)	Transect 3 (ft)	
(1)				
(2)				
(3)				
Average Depth (Z)				



3. Surface Velocity(V) = Length/Time

(Allow the object to attain velocity before timing it.)

	Length (ft)	Time (sec)	Velocity ft/sec
(1)			
(2)			
(3)			
		Average Velocity (V)	

Unit Conversions
1 in = 0.0833 ft
1 m = 3.281 ft

4. Stream Flow = Discharge (D)

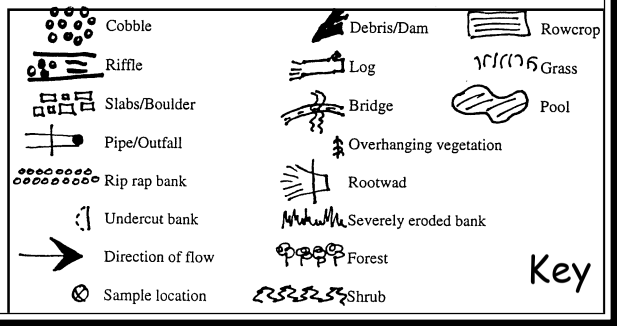
Avg. Width (W)		feet
Avg. Depth (Z)		feet
Avg. Velocity (V)		feet/sec
*(n) = 0.9 or 0.8		none
Discharge (D)		ft^3/s = (cfs)

Multiply W x Z x V x n = D

*n is a constant indicating roughness of substrate - use 0.9 for sandy, muddy bottom or bedrock; use 0.8 for gravel or rocky bottom

Convert measurements of feet + inches to 10^{ths} of feet. **Example: 10 ft + 4 in = 10.33 ft**. (Multiply 4 inches x 0.0833 feet/inch = 0.3332 ft. Add this to 10 feet 10.33 feet.)

Stream Site Map



STANDARD CHEMICAL MONITORING (GREEN) DATA SHEET

Date ____/____/____ (MM DD YY) Begin Time _____:_____ (am/pm) # Adults _____

End Time _____:_____ (am/pm) # Students _____

Certified Monitors' Names_____ Volunteer ID_____

Organization Name _____

Watershed Name _____ Watershed # __ __ __ __ __ __ __ __

Stream/River Name _____ Site ID _____

(Please do not abbreviate.) (Above ID numbers are required.)

Current Weather ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (Steady) ☐ Storm (Heavy)

Weather in Past 48 hrs. ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (Steady) ☐ Storm (Heavy)

	Excellent	Good	Fair	Poor
Dissolved Oxygen (% saturation)	☐ 110 - 91	☐ 90 - 71	☐ 70 - 51	☐ <50
BOD5 (ppm = mg/L) **DO original sample** _____ minus **DO 5-Day sample** _____	☐ 0	☐ 2 - 4	☐ 6 - 8	☐ >8
Nitrate (ppm) ***(Note: values are estimated)***	☐ 0 clear	☐ >0 - <5	☐ 5	☐ >5
pH	☐ 7	☐ 6 or 8	☐ 5 or 9	☐ <4 or >10
OrthoPhosphate (ppm)	☐ 0 clear	☐ > 0 - 2	☐ > 2 - 4	☐ >4
Temperature change (°C) **Downstream site** _____ minus **Upstream 1-mile** _____	☐ 0 - 2	☐ 3 - 5	☐ 6 - 10	☐ >10
Turbidity (NTU = JTU)	☐ 0	☐ >0 - 40	☐ >40 - 100	☐ >100
***E.* coli (colonies/100mL)**	☐ 0	☐ 1 - 300	☐ 301 - 500	☐ >500
Add # of Checks in Each Column				
	# Excellent x 4	# Good x 3	# Fair x 2	# Poor x 1

Excellent	**4**
Good	**3**
Fair	**2**
Poor	**1**

Add Column Totals ÷ # of Tests Performed = **Overall Water Quality**

Date		Air Temp	°C
Time	Stream Name and Site ID	Water Temp	°C

Chemical Monitoring Work Sheet

Current Weather: ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (Steady) ☐ Storm (Heavy)

Weather in past 48 hrs: ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (Steady) ☐ Storm (Heavy)

	Units	Sample 1	Sample 2	Sample 3	Average	State Standard
Dissolved Oxygen (DO)	% Saturation					Avg > 5 mg/L > 4 mg/L > 7 mg/L for trout
	mg/L					
Avg DO (original) **— ~~DO after 5 days~~** **BOD 5-day (difference)**	mg/L	—	—	—	—	none
***E.* Coli**	colonies/ 100 mL					< 235 colonies/ 100 mL
pH	units					Avg 6-9
Temp at Your Site **— ~~Upstream (1 mi) Temp~~** **~~Temperature Change~~**	◦C	—	—	—	—	< 5◦ F < 2◦ F in a trout stream
Total Phosphate	mg/L					< .04 mg/L (in Lake Michigan)
Nitrate (NO_3)	mg/L					< 44 mg/L
Transparency (Tube)	cm					none
Turbidity (from chart use in database entry)	NTU/JTU					
Orthophosphate	mg/L					none
Ammonia Nitrogen	mg/L					.076 mg/L (at pH 7, 20◦C)
Total Solids	mg/L					
Other _____						
Other _____						

ADVANCED CHEMICAL MONITORING DATA SHEET

Date ____/____/____ (MM DD YY) Begin Time _____:_____ (am/pm) # Adults _____

End Time _____:_____ (am/pm) # Students _____

Certified Monitors' Names_____ Volunteer ID_____

Organization Name _____

Watershed Name _____ Watershed # __ __ __ __ __ __ __ __

Stream/River Name _____ Site ID _____

(Please do not abbreviate.) (Above ID numbers are required.)

Current Weather ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (Steady) ☐ Storm (Heavy)

Weather in Past 48 hrs. ☐ Clear/Sunny ☐ Overcast ☐ Showers ☐ Rain (Steady) ☐ Storm (Heavy)

WATER QUALITY INDEX (WQI)

You may perform as many of the following tests as you wish; however, at least 6 must be completed to obtain a Total Water Quality Index value. Divide the total of the *Calculation* column by the total of the *Weighting Factor* column to obtain the Water Quality Index rating.

Test Results		*Q-Value*		*Weighting Factor*		*Calculation*
	_____ mg/L					
Dissolved Oxygen	_____ % saturation	_____	X	**.18**	=	_____
***E.* coli**	_____ colonies/100mL	_____	X	**.17**	=	_____
pH	_____ units	_____	X	**.12**	=	_____
B.O.D. 5	_____ mg/L	_____	X	**.12**	=	_____
H_2O Temp Change	_____ change in°C	_____	X	**.11**	=	_____
Total Phosphate	_____ mg/L	_____	X	**.11**	=	_____
Nitrate (NO_3)	_____ mg/L	_____	X	**.10**	=	_____
Turbidity	_____ NTU's	_____	X	**.09**	=	_____

TOTALS _____ _____

Excellent	90 - 100%	Bad	25 - 49%
Good	70 - 89%	Very Bad	0 - 24%
Medium	50 - 69%		

WATER QUALITY INDEX RATING ☐

BIOLOGICAL MONITORING DATA SHEET

Date ____/____/____ (MM DD YY) Begin Time _____:_____ (am/pm) # Adults _____

End Time _____:_____ (am/pm) # Students _____

Certified Monitors' Names_____ Volunteer ID_____

Organization Name _____

Watershed Name _____ Watershed # __ __ __ __ __ __ __ __

Stream/River Name _____ Site ID _____

(Please do not abbreviate.) (Above ID numbers are required.)

Check Methods Used

- ☐ Kick Seine Net (3 times)
- ☐ D-Net (20 jabs or scoops)

Check Habitats Sampled

- ☐ Riffles
- ☐ Leaf Packs
- ☐ Undercut Banks
- ☐ Snags/Vegetation
- ☐ Sediment
- ☐ Other

POLLUTION TOLERANCE INDEX (PTI)

PT GROUP 1 *Intolerant*		PT GROUP 2 *Moderately Intolerant*		PT GROUP 3 *Fairly Tolerant*		PT GROUP 4 *Very Tolerant*	
Stonefly Nymph	_____	Damselfly Nymph	_____	Midges	_____	Left-Handed Snail	_____
Mayfly Nymph	_____	Dragonfly Nymph	_____	Black Fly Larvae	_____	Aquatic Worms	_____
Caddis Fly Larvae	_____	Sowbug	_____	Planaria	_____	Blood Midge	_____
Dobsonfly Larvae	_____	Scud	_____	Leech	_____	Rat-tailed Maggot	_____
Riffle Beetle	_____	Crane Fly Larvae	_____				
Water Penny	_____	Clams/Mussels	_____				
Right-Handed Snail	_____	Crayfish	_____				
# Of TAXA	_____	**# Of TAXA**	_____	**# Of TAXA**	_____	**# Of TAXA**	_____
Weighting Factors: **(x 4)**	_____	**(x 3)**	_____	**(x 2)**	_____	**(x 1)**	_____

23 or More	**Excellent**
17 - 22	**Good**
11 - 16	**Fair**
10 or Less	**Poor**

POLLUTION TOLERANCE INDEX RATING

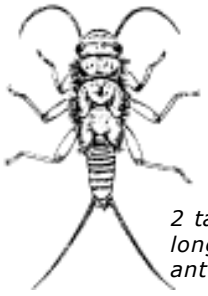
(Add the final index values for each group.)

Other Biological Indicators

☐ Native Mussels ☐ Zebra Mussels ☐ Rusty Crayfish ☐ Aquatic Plants _____ % Algae Cover _____ Diversity Index

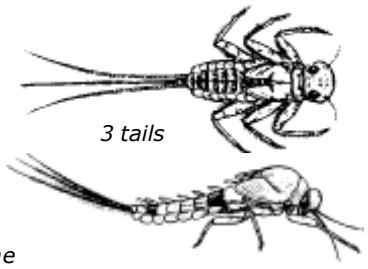
Macroinvertebrate Identification Key

GROUP 1 – Very Intolerant of Pollution



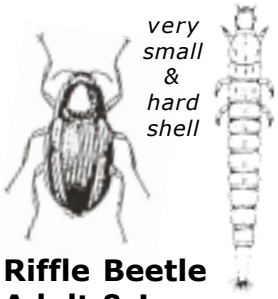
2 tails long antennae

Stonefly Nymph



3 tails

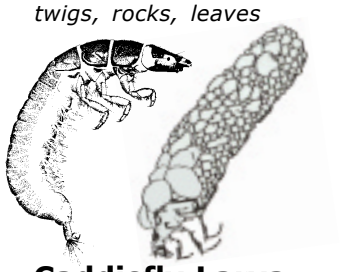
Mayfly Nymph



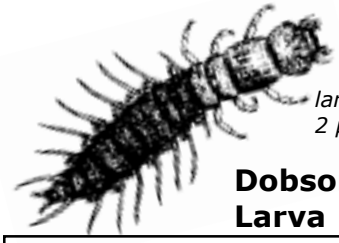
very small & hard shell

Riffle Beetle Adult & Larva

makes a case from twigs, rocks, leaves



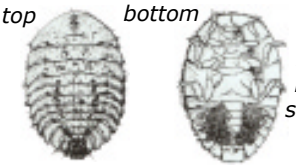
Caddisfly Larva



large head & 2 pinchers

Dobsonfly Larva

top *bottom*



looks like a suction cup

Water Penny Larva

Right-Handed Snail

must be alive to count

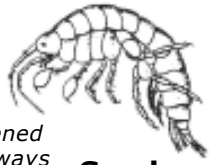
GROUP 2 – Moderately Intolerant of Pollution

3 paddle-like (feathery) tails

Damselfly Nymph

Dragonfly Nymph

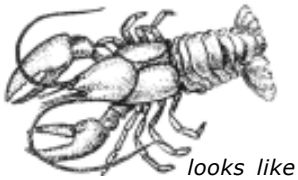
no tails large eyes



flattened side-ways & swims on side

Scud

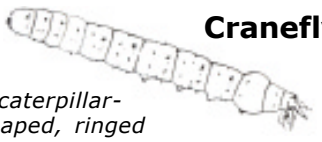
Crayfish



looks like a mini-lobster

Sowbug

flattened top to bottom (looks like a pill bug)



Cranefly

caterpillar-shaped, ringed

must be alive to count

Clam/Mussel

GROUP 3 – Fairly Tolerant of Pollution

Midge Larva

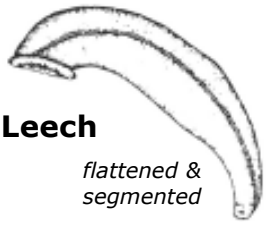
small, but visible head intense wiggler

Planaria

2 eye spots & very small

one end is swollen

Black Fly Larva

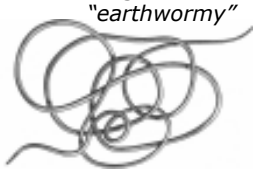


Leech

flattened & segmented

GROUP 4 – Very Tolerant of Pollution

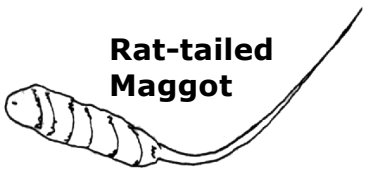
segmented "earthwormy"



Aquatic Worms

must be alive to count

Left-Handed Snail



Rat-tailed Maggot

bright red

Blood Midge Larva

Internet Database Record-keeping Form

Riverwatch Database Password: ___ ___ ___ ___ ___ ___ ___ ___

Volunteer Identification Number: ___ ___ ___ ___

Site Identification Number: ___ ___ ___ ___

(If you have more than one site, copy this recordkeeping form. Use a separate form for each site.)

YEAR:

Date of Sampling	Date(s) of Data Entry	Data Entry Completed	Completed by (Initials)
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	